

My TUM Course Navigator Project Documentation

for CIT623000 Responsible, Sustainable and Inclusive Digital Product Creation

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This project addresses challenges related to students' course selection at TUM. The project followed a structured design process that combined user research, reflection, and iterative development.

Conscious Service Design methods were used throughout the semester, helping to critically examine assumptions, consider diverse user perspectives, contextual constraints, and ethical implications. This documentation outlines how the selected methods were applied and how they influenced the project's direction and design decisions.

Inclusive segment cards

Inclusive Segment Cards were used to identify and articulate the needs, constraints, and motivations of diverse student groups involved in the course selection process. Rather than focusing on demographic stereotypes, the cards helped structure discussions around **needs, pains, gains, and privilege**, supporting a more inclusive and reflective design process.

Self-Directed Academic Students

1 User Group Data	2 Wheel of Power	3 Role	4 Needs	5 Gains
<p>User Group Data</p> <p>Stick to the facts. Base everything on data, not assumptions. Skip opinions and avoid stereotypes.</p> <p>Demographic</p> <ul style="list-style-type: none">Study Program Bachelor's/Master's students across TUM facultiesElective Structure Must fulfill specific module requirements; occasionally need cross-faculty electivesLanguage<ul style="list-style-type: none">English-first students or German learnersPersonality traits<ul style="list-style-type: none">Organized, proactive, independent decision-maker <p>Vivian</p> <p>Data Sources</p> <p>Experience</p> <p>Vivian</p>	<p>Check Privilege</p> <p>Critically reflect on the concrete privileges this group has (e.g., access to resources, influence on decisions, technical expertise). Stick to facts, not assumptions.</p>  <p>The diagram is a circular 'Wheel of Power' chart. The center is labeled 'Privilege'. Around the perimeter, clockwise from top-left, are labels: 'Living with a partner', 'Middle class', 'No static profession', 'High income', 'Older', 'Citizen', 'English as a native language', 'High education', 'Educated', 'White', 'Men', 'No women', 'DNC persons', 'POC', 'No education', 'Lesser social status', 'Heterosexual', 'Christian', 'Atheist', 'Light skin', 'Dark-skinned', 'Women', 'Younger', 'Non-European origin', 'Non-native language', 'Working class', 'Young', 'Adult', 'Elder or youth', 'Large-bodied', 'Thin', 'Small-busted', 'Male', 'Female', 'Oppression'.</p>	<p>User Group Role</p> <p>Describe this group's role in relation to the product. Focus on what they do or need (e.g., daily users, testers, decision-makers).</p> <p>Primary decision-makers evaluating electives</p> <p>Early adopters of a course recommendation or course clarity tool.</p>	<p>Needs & Pains</p> <p>Identify what this group needs or struggles with (e.g., access to information, ease of use, lack of time, technical barriers).</p> <ul style="list-style-type: none">Annoying process and inefficient module select/search in TUMonline<ul style="list-style-type: none">Key words search not working in search engineHard to check if electives match degree requirementsback and forth process to check offered semester, description, and register processUnclear course descriptions, exam form, and workload<ul style="list-style-type: none">courses lack full descriptionDifficulty discovering courses outside their curriculum <p>Vivian</p>	<p>Gains</p> <p>Describe this group's role in relation to the product. Focus on what they do or need (e.g., daily users, testers, decision-makers).</p>

User Story: "As a TUM student who wants to choose the right electives for my degree, I want a tool that clearly shows which courses match my module requirements and are available this semester, so I can save time and confidently pick the best options without navigating confusing pages on TUMonline."

Relevance

This group includes students who are structured in their academic planning and need to fulfill specific module or degree requirements. Their course choices are often constrained by formal rules, prerequisites, and credits amount, making clarity and efficiency particularly important. The main pain points of this group are frustration with inefficient search and filtering in TUMonline and unclear course descriptions (esp. workload, exam formats, etc.).

Impact on design decisions

Insights from this group reinforced the need for: clear visual module compatibility, transparent workload and exam information + reduced friction in the course discovery and curriculum-relevance assessment.

Explorers & Curriculum-Breakers

1 User Group Data

User Group Data

Stick to the facts. Base everything on data, not assumptions. Skip opinions and avoid stereotypes.

Demographic	
Study Program	Highly interdisciplinary students; often Master's or Erasmus
Language	Often bilingual; comfortable in English courses
Vivian	Vivian
Data Sources	
Experience	
Vivian	Vivian

2 Wheel of Power

Check Privilege

Critically reflect on the concrete privileges this group has (e.g., access to resources, influence on decisions, technical expertise). Stick to facts, not assumptions.

3 Role

User Group Role

Describe this group's role in relation to the product. Focus on what they do or need (e.g., daily users, testers, decision-makers).

Exploratory users who stress-test the platform's cross-faculty search capabilities.
Vivian

4 Needs

Needs & Pains

Identify what this group needs or struggles with (e.g., access to information, ease of use, lack of time, technical barriers).

Hard to find interesting "hidden" courses across departments	TUMonline search does not surface cross-faculty options well
Want new skills (design, coding, business, etc.) but unsure about eligibility	Frustrated by inconsistent course descriptions across departments
Unsure if scheduling clashes or prerequisites exist	

5 Gains

Gains

Describe this group's role in relation to the product. Focus on what they do or need (e.g., daily users, testers, decision-makers).

- Discovery of unique or non-obvious courses matching personal interests
- Clear information on prerequisites and eligibility
- A curated list of interdisciplinary opportunities
- Ability to craft a personalized learning path
- More satisfaction and autonomy in academic exploration

Vivian

User Story: "As a TUM student who wants to go beyond my curriculum and discover interesting courses across different faculties, I want an easy search tool that surfaces interdisciplinary electives and explains prerequisites, so I can build a more personalized and diverse academic experience."

Relevance

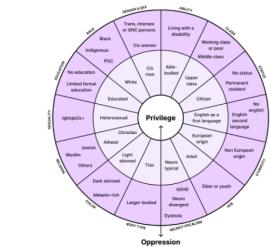
This group represents students who actively seek courses beyond their mandatory curriculum, often across faculties. They are driven by personal interest and need for skill

development but face difficulties discovering suitable electives and understanding prerequisites. Students of this group experience difficulty finding “hidden” courses and desire for inspiration and course recommendations that align with their personal interest.

Impact on design decisions

This user group highlighted the importance of: discovery-oriented search features + support of the exploratory behavior.

Students Facing Social or Safety Challenges

1 User Group Data	2 Wheel of Power	3 Role
<p>User Group Data</p> <p>Stick to the facts. Base everything on data, not assumptions. Skip opinions and avoid stereotypes.</p> <p>Demographic</p> <ul style="list-style-type: none"> Study Program: TUM students across all faculties Elective Structure: Unsure about module choice; lacking social networks Language: Often international students; may struggle to understand spoken German Personality traits: <ul style="list-style-type: none"> • Introverted, anxious about interaction, sensitive to previous negative experiences (harassment, humiliation) • Emotional burden: feeling unsupported in student life <p>Data Sources</p> <ul style="list-style-type: none"> Experience: Vivian 	<p>Check Privilege</p> <p>Critically reflect on the concrete privileges this group has (e.g., access to resources, influence on decisions, technical expertise). Stick to facts, not assumptions.</p>  <p>4 Needs</p> <p>Needs & Pains</p> <p>Identify what this group needs or struggles with (e.g., access to information, ease of use, lack of time, technical barriers).</p> <ul style="list-style-type: none"> Negative experiences asking academic questions (feeling judged or harassed) Wants to avoid social interaction and rely on anonymous guidance No friends or student clubs to ask for advice Similar course-selection pains as Group 1 (unclear offerings, exam style, requirement matching) 	<p>User Group Role</p> <p>Describe this group's role in relation to the product. Focus on what they do or need (e.g., daily users, testers, decision-makers).</p> <p>Vivian</p> <p>5 Gains</p> <p>Describe this group's role in relation to the product. Focus on what they do or need (e.g., daily users, testers, decision-makers).</p> <ul style="list-style-type: none"> • Non-judgmental, anonymous, safe academic guidance • Confidence without needing to talk to strangers • Clear elective suggestions without social stress • Reduced anxiety through transparent course expectations • Feeling of being supported even without a network <p>Vivian</p>

User Story: "As a TUM student who feels anxious asking others for help due to past negative experiences, I want an anonymous and judgment-free way to understand course content and requirements, so I can choose electives without needing uncomfortable social interactions."

Relevance

This group includes students who feel socially unsupported, anxious about asking questions, or affected by past negative academic or social experiences. Their challenges are often invisible but significantly impact confidence and decision-making. Such students tend to prefer anonymous, judgment-free information sources.

Impact on design decisions

Insights from this group emphasized: the need for anonymity and non-judgmental guidance and designing for emotional safety alongside functional clarity.

Reflection on the method

Using Inclusive Segment Cards helped us critically reflect on assumptions about “typical” students and differences in access and confidence. The method supported more informed design decisions by grounding discussions in concrete user needs and by ensuring that vulnerable or less visible student groups were considered throughout the design process.

Initially, the Inclusive Segment Cards were developed based on observations, course experiences, and team discussions, and therefore reflected **assumptions**. To validate and refine these, a quantitative survey was conducted among TUM students.

The survey results largely confirmed the relevance of the identified user groups. In particular, they highlighted a strong need for **structured semester planning and course comparison** among students who must navigate module requirements and workload constraints (which are our primary user group). Additionally, the data revealed the importance of **personal interest and exploratory behavior** in course selection, supporting the inclusion of students seeking courses beyond their core curriculum.

Responses related to information sources indicated that a subset of students highly relies on peer recommendations, reinforcing the relevance of **anonymity and non-judgmental access to information** for students facing social or psychological barriers.

Critical Reflection cards

The Critical Reflection Cards is a tool used to identify ethical, social, and sustainability-related risks in digital products. The method supports critical discussion of potential negative impacts, blind spots, and unintended consequences. In this section we will further reflect on how each discussion impacted our features (**Smart Course Search, Personalized Course Recommendations, Semester Planner, Peer Course Reviews**) and what thoughts it triggered.

Card One: Bullying and Harassment

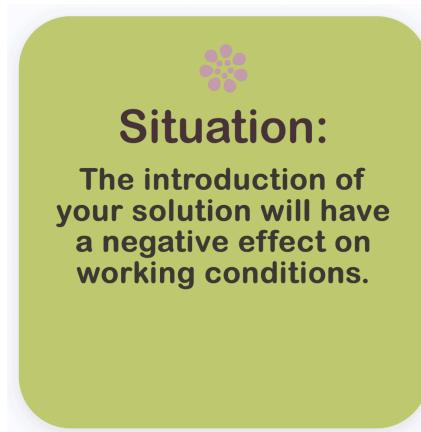


We discussed that course-selection is already a high-stress context. Students who have experienced bullying may avoid spaces where they can be judged, bullied, or attacked (for example, Whatsapp/Discord chats, Facebook groups, etc.). A review system can unintentionally become a channel for “public shaming” (e.g., overly personal comments about lecturers, cohorts, or specific students) and can amplify fear of participating.

This reflection card is tied to the previously identified **Students Facing Social or Safety Challenges** user group. Students in this group are particularly sensitive to public judgment in academic contexts. For them, unstructured or emotionally charged reviews can trigger stress and avoidance.

To address these concerns, we designed the review system in a way that minimizes the risk of public judgment and emotional exposure. **Clear review guidelines** define what type of feedback is appropriate and constructive, helping to set expectations and prevent harmful comments. **Reviewers remain anonymous** at the interface level, which reduces fear of negative social interactions and lowers the barrier for participation for students who feel vulnerable. This anonymity is complemented by **moderation and reporting** to ensure that safety is maintained for all users (explained in the next section).

Card Two: Working Conditions



The introduction of a Peer Review Course Evaluation System may negatively affect the working conditions of teaching staff. Even when student anonymity is preserved, unmoderated feedback can create stress, reputational harm, and a sense of constant surveillance for lecturers and professors. While the **Peer Course Reviews** feature empowers students, it also introduces a power imbalance where teaching staff are evaluated without direct control over the platform.

While discussing this card, we recognized that unrestricted free-text reviews could enable harassment, unfair criticism, or emotionally harmful language, even when not intended.

To address this, we deliberately moved away from open comment sections toward **structured and neutral feedback formats**. Reviews are based on predefined categories, combined with descriptive tags rather than personal commentary. In addition, automated

moderation mechanisms, including AI-based harassment and hate-speech filtering, help ensure that submitted content remains respectful and constructive.

Although student anonymity is preserved at the interface level to encourage feedback participation, reviews are still **linked to verified student accounts internally (TUMonline)**. This creates accountability within the system while protecting psychological safety for both students and teaching staff.

Card Three: Personal Information Disclosure



This situation is particularly relevant to the **Personalized Course Recommendations** feature, where personalization mechanisms can implicitly encourage users to disclose sensitive information. The card made us question what level of personal data is truly necessary to deliver meaningful personalization. While many students value tailored recommendations, not all feel comfortable sharing private details such as mental health challenges, personal struggles, or identity-related information.

Therefore, we opted for a **data-minimization approach**. Personalization is primarily based on non-sensitive information such as curriculum structure, stated academic interests, and past course interactions, rather than personal or identity-related data. Any **additional inputs are optional** and are accompanied by transparent explanations that clarify why the information is requested and how it benefits the user. The system also offers privacy-first defaults, allowing students to receive recommendations even with minimal setup or without creating a detailed profile.

How the Conscious Service Design methods supported and shaped the project

The Conscious Service Design methods played a central role in shaping the direction and the ethical grounding of the project. Rather than applied as isolated exercise, the methods continuously promoted design discussions and feature prioritization throughout the semester.

The **Inclusive Segment Cards** helped shift our perspective from designing for a “typical” student toward acknowledging diverse needs, constraints, and emotional contexts. By explicitly considering students who actively explore courses beyond their curriculum, and students facing social or psychological barriers, alongside with realizing that the students from the primary group are highly structured in their academic planning, we were able to balance functional clarity with emotional safety. This directly influenced the development of our core features such as the **Peer Course Reviews, Semester Planner, Smart Course Search, and Personalized Course Recommendations**, which combine curriculum alignment with discovery-oriented exploration while avoiding unnecessary complexity or pressure.

The **Critical Reflection Cards** encouraged systematic reflection on the broader social, ethical, and institutional impacts of the solution. These reflections moved the project beyond usability concerns and promoted discussions about power dynamics, responsibility, and unintended consequences. As a result, several conscious design decisions emerged, including the use of **student anonymity, controlled and moderated feedback, and neutral course evaluation formats**. These choices were not driven solely by user convenience but by an explicit intention to protect vulnerable students, prevent harassment, and avoid placing pressure on teaching staff.

Together, these methods ensured that design decisions were not only user-centered but also context-aware and ethically informed. They helped us justify why certain features were included, constrained, or deliberately omitted. Overall, the Conscious Service Design methods shaped the project into a solution that supports informed course selection while fostering a safe, respectful, and inclusive academic environment.

Appendix A: Survey Results

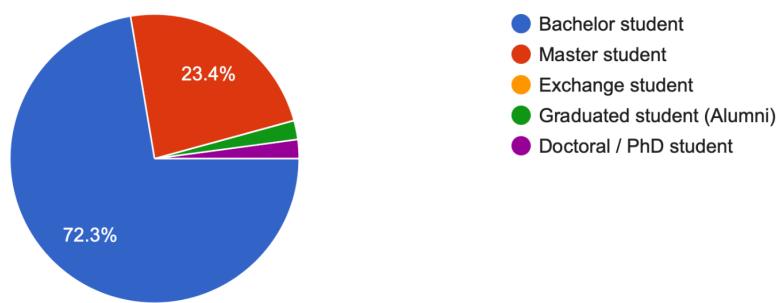
To validate and refine the assumptions derived from the Inclusive Segment Cards, a quantitative survey was conducted among TUM students. The goal of the survey was to better understand students' course selection behavior, information sources, decision-making challenges, and priorities when choosing courses.

A total of **47 current and former TUM students** participated in the survey, covering different academic stages, including Bachelor's, Master's, and doctoral studies, and more than 10 different study programs. The results were used to assess the relevance of the identified user groups and to support key design decisions related to course discovery, semester planning, personalization, and anonymous access to information.

The following section presents selected survey results that informed and supported the design process.

What is your current academic status?

47 responses



In the following section, participants evaluated a series of statements related to **course selection behavior, information access, decision-making challenges, and preferences for guidance**. The statements were designed to explore how students search for courses, how confident they feel during the selection process, and to what extent they value independent, anonymous, or structured support. Responses were collected using a **5-point scale**, ranging from **1 ("strongly disagree")** to **5 ("strongly agree")**. This approach

allowed us to assess general tendencies, levels of agreement, and potential areas of friction in the course selection experience across different student profiles.

Taking courses outside my curriculum is important for exploring and shaping my future career path.
47 responses

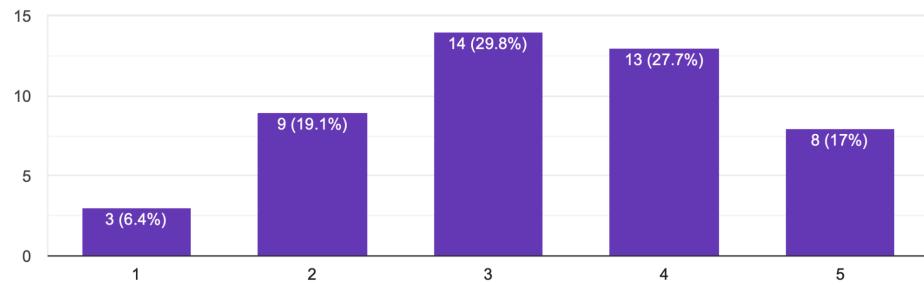


Figure A1: Course selection outside curriculum

I actively look for courses outside my main department or faculty.
47 responses

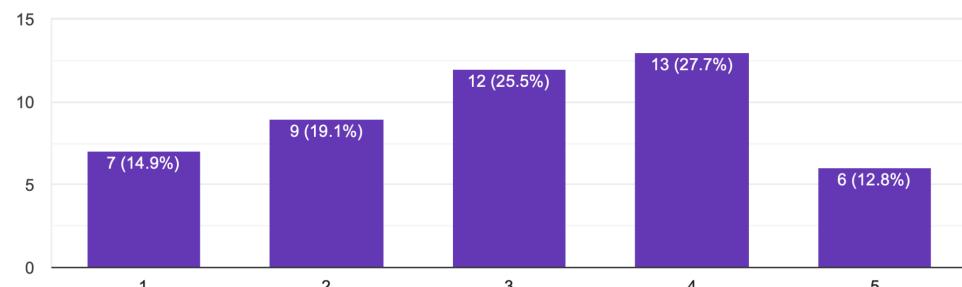


Figure A2: Exploratory behavior

I would value anonymous or non-interactive digital guidance when choosing courses.

47 responses

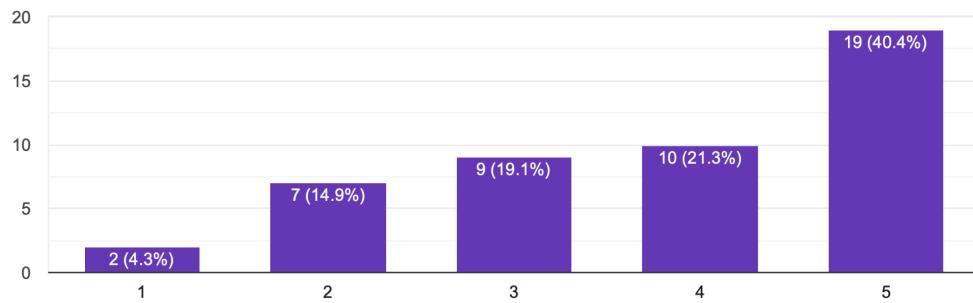
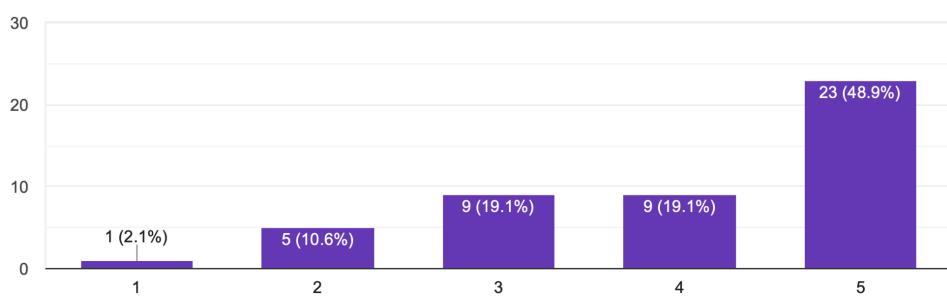


Figure A3: Anonymity value

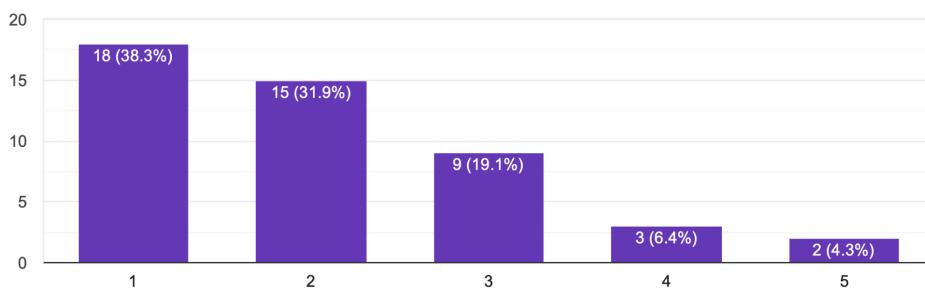
I need to consider multiple factors at the same time (e.g., eligibility, workload, credits, module restriction) when registering for a course.

47 responses



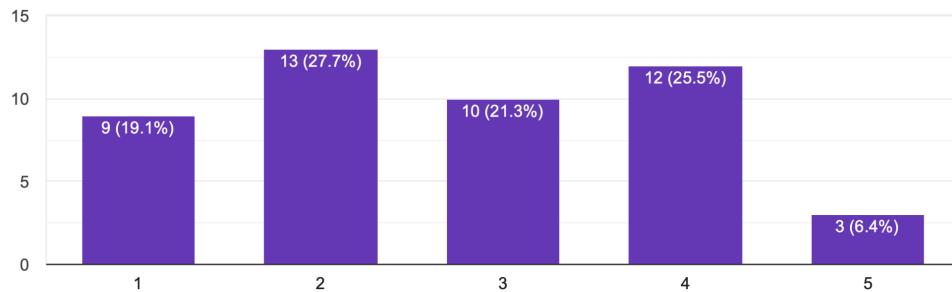
I always know where to find information about newly offered seminars or courses.

47 responses



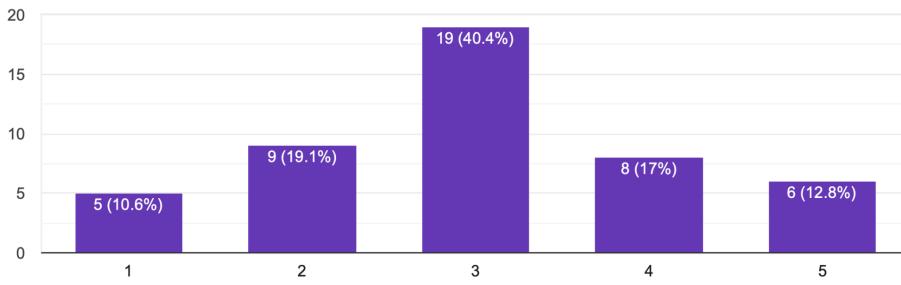
I can easily find senior students or peers with relevant experience to ask about course details or recommendations.

47 responses



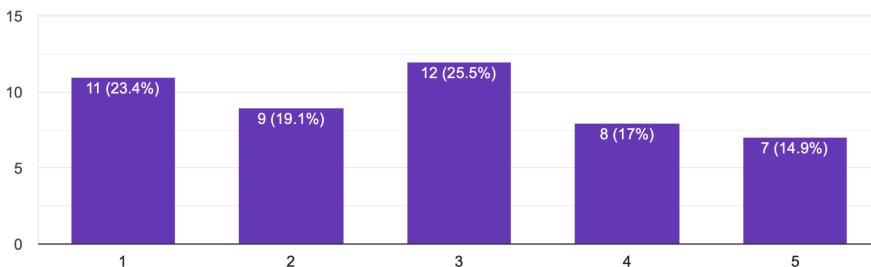
I prefer to explore and evaluate courses privately rather than asking others.

47 responses



I have had negative experiences asking questions about course information/selection in online settings (e.g., group chats, forums).

47 responses



In addition to the scaled statements, the survey included **multiple-choice and selection-based questions** aimed at capturing **concrete decision factors and information sources** used during course selection. These questions focused on practical behaviors, such as which criteria students prioritize, where they obtain information, and which resources they rely on most when making decisions.

What factors are most important to you when choosing a course?

47 responses

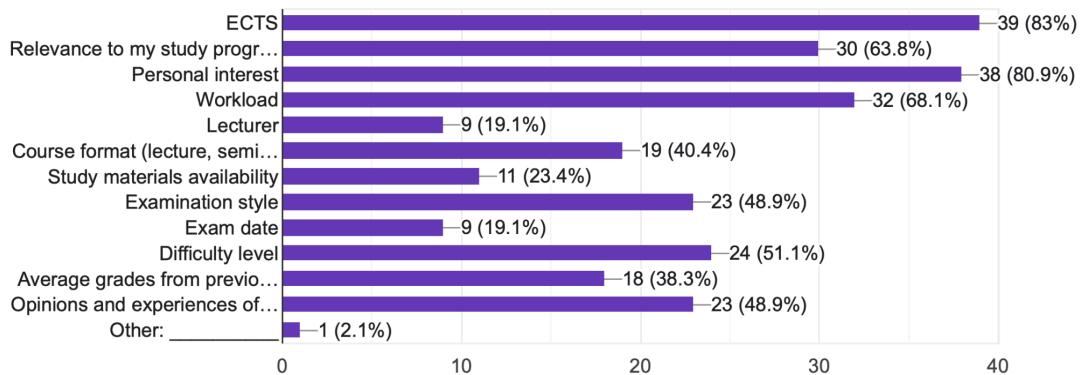


Figure A4: Choice-supporting factors

How do you usually select your courses?

47 responses

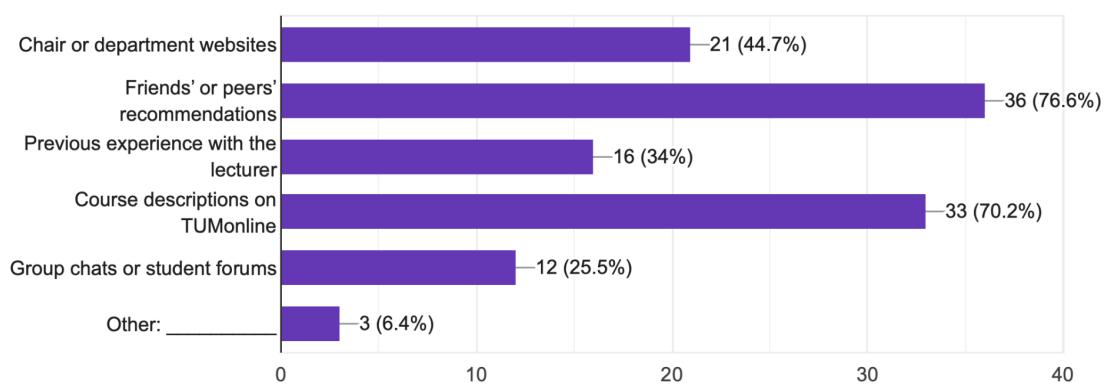
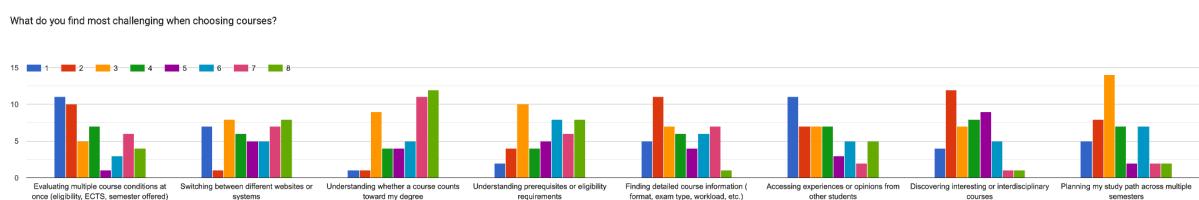


Figure A5: Sources of information



Overall, the survey results provided an empirical validation of the identified user groups and supported key design decisions, particularly in the areas of course discovery, comparison, personalization, and anonymous course review.